

FORM PTO-1590 (REV. 11-2-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER VWF-516-A	
		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <b>09/868224</b>	
INTERNATIONAL APPLICATION NO. PCT/FR99/03106	INTERNATIONAL FILING DATE 10 December 1999	PRIORITY DATE CLAIMED 15 December 1998	
TITLE OF INVENTION MOTOR VEHICLE WIPER COMPRISING A WEAR INDICATOR			
APPLICANT(S) FOR DO/EO/US Francois Broszniewski			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</li> <li>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</li> <li>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</li> <li>b. <input type="checkbox"/> has been communicated by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li>6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> is attached hereto.</li> <li>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</li> </ol> </li> <li>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</li> <li>b. <input type="checkbox"/> have been communicated by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).</li> <li>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <b>Unsigned</b></li> <li>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>			
<p><b>Items 11 to 20 below concern document(s) or information included:</b></p> <ol style="list-style-type: none"> <li>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.</li> <li>14. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li>15. <input checked="" type="checkbox"/> A substitute specification.</li> <li>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</li> <li>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</li> <li>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</li> <li>20. <input checked="" type="checkbox"/> Other items or information. <b>Red-Lined Specification</b></li> </ol>			

OFFICE OF COMMISSIONER OF PATENTS AND TRADEMARKS <b>097868224</b>		INTERNATIONAL APPLICATION NO <b>PCT/FR99/03106</b>		ATTORNEY'S DOCKET NUMBER <b>VWF-516-A</b>	
21. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. .... \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$690.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$100.00 <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS PTO USE ONLY</b>	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ 860 \$ 130	
<b>CLAIMS</b>	<b>NUMBER FILED</b>	<b>NUMBER EXTRA</b>	<b>RATE</b>		
Total claims	7 - 20 =		x \$18.00		
Independent claims	1 - 3 =		x \$80.00		
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$270.00	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$ 990</b>	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$ 0	
<b>SUBTOTAL =</b>				<b>\$ 990</b>	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ 0	
<b>TOTAL NATIONAL FEE =</b>				<b>\$ 990</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$ 0	
<b>TOTAL FEES ENCLOSED =</b>				<b>\$ 990</b>	
				<b>Amount to be refunded:</b>	\$
				<b>charged:</b>	\$

a. ☒ A check in the amount of \$ 990.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
 A duplicate copy of this sheet is enclosed.


c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
 overpayment to Deposit Account No. 25-0115A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card  
 information should not be included on this form. Provide credit card information and authorization on PTO-2038.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

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 William M. Hanlon, Jr.  
 NAME  
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 REGISTRATION NUMBER

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09/868224

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Box PATENT APPLICATION  
Assistant Commissioner of Patents  
Washington, D.C. 20231**EXPRESS MAIL LABEL NO.:****EL845187608US**

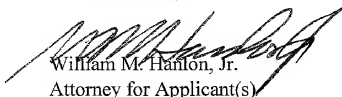
Sir:

Enclosed please find a national stage application for U.S. Patent under 35 CFR  
§371 as identified below.Inventor: François Broszniowski  
Invention: **MOTOR VEHICLE WIPER COMPRISING A WEAR  
INDICATOR**and including: Postcard; Transmittal Letter; Preliminary Amendment; Substitute  
Specification; 1 sheet of drawing; Unsigned Copy of Combined Declaration and Power of  
Attorney; Red-line Specification; Verified English Language Translation; Copy of the  
International Application; Information Disclosure Statement including Form PTO-1449 and the  
cited references;

Filing Fee:	\$860.00
Late Declaration Surcharge:	<u>\$130.00</u>
Total	\$990.00

Please charge any deficiency or credit any excess in the enclosed fees to Deposit  
Account No. 25-0115.

Respectfully submitted,

YOUNG, BASILE, HANLON, MacFARLANE, WOOD &  
HELMHOLDT, P.C.
  
William M. Hanlon, Jr.  
Attorney for Applicant(s)  
Registration No. 28422

WMH/jao

Our Reference: VWF-516-A

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: François Broszniowski  
Serial Number: Unknown  
Filing Date: Concurrent  
Examiner/Art Group Unit: Unknown/Unknown  
Title: MOTOR VEHICLE WIPER COMPRISING A  
WEAR INDICATOR

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents  
Washington, D.C. 20231

Sir:

If any charges or fees must be paid in connection with the following communication, they may be paid out of our Deposit Account No. 25-0115.

Prior to initial examination, please amend the above-identified patent application as indicated below.

In the specification:

After the claims, start a new page containing:

ABSTRACT

A motor vehicle wiper includes a wiper blade mounted on the free end of a wiper arm and pressing a wiping stem against the glass to be wiped. The wiper is provided with a wear indicator using a substance based at least on an azo compound.

In the claims:

Cancel claims 1-7 and substitute therefor:

8. (New) A motor vehicle wiper including a wiper blade mounted at the free end of a wiper arm in order to press a wiping stem against a

window to be wiped, characterized by the wiper being provided with an wear indicator comprising a substance based at least on an azo compound.

9. (New) The wiper according to claim 8, characterized by the wear indicator having multi-layers comprising an adhesive layer and a plastic support film of at least one inert layer made of a substance of a reference color and a reactive degradable layer made from a substance of a different color based on azo compounds.

10. (New) The wiper according to claim 9, characterized by the inert and reactive layers being formed respectively by an ink in which a chemically inert pigmentation, defining the reference color, and an organic pigment based on azo by-products are produced.

11. (New) The wiper according to claim 10, characterized by the organic pigments being mixed with mineral oxides.

12. (New) The wiper according to claim 10, characterized by the inks being successively places on the plastic support via silk screening.

13. (New) The wiper according to claim 9, characterized by the plastic support film being of one of polyvinyl, polypropylene and polyester and being covered by a protective mask fixed to the support film in a detachable manner, via a semi-porous adhesive, the mask being pulled back during the mounting of the blade on the wiper.

14. (New) The wiper according to claim 8, characterized by the wear indicator being carried by the wiper blade.

REMARKS

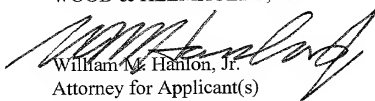
Claims 1-7 have been cancelled. Claims 8-14 have been added. The new claims are being added to place the claims in United States patent claim format and to use idiomatic English. The new claims are not being submitted to address any issues of patentability .

A handwritten, corrected copy of the specification is enclosed showing the changes which have been made to the specification as required by Section 608.01(Q) and 714.20(1) of the Manual of Patent Examining Procedure. The Substitute Specification filed herewith has been amended to utilize idiomatic English, correct minor typographical and grammatical errors and to conform the application to current United States patent practice. The Substitute Specification includes no new subject matter; but does include the same changes handwritten in red in the attached, corrected, original specification. Entry of the Substitute Specification is respectfully requested.

It is submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Consideration of the application as amended is requested.

Respectfully submitted,

YOUNG, BASILE, HANLON, MacFARLANE,  
WOOD & HELMHOLDT, P.C.



William M. Hanlon, Jr.  
Attorney for Applicant(s)  
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Troy, Michigan 48084-3107

Dated: June 15, 2001  
WMH/jao

SUBSTITUTE SPECIFICATION

Our Reference: VWF-516-A

PATENT

**MOTOR VEHICLE WIPER COMPRISING A WEAR INDICATOR**

BACKGROUND

This invention concerns the wiping means of the windows of motor vehicles and, more specifically, their wear.

A wiper blade equipped with its elastic wiper stem is a piece of the vehicle that wears out and which is necessary to replace regularly if one wants to guarantee a good wiping quality of the window. This proves to be even more important for the driving safety while one is using the wiper blade on the front windshield of the vehicle.

The sources of wear are numerous and the blade is susceptible to degrading as much at the level of the wiper stem as at the joints and the articulation mount that carries it.

For example, the wiper stem is susceptible to wear via friction but can also wear due to the deterioration of the material that it is made of.

The agents of such deterioration are principally:

- sun light, and more specifically, ultraviolet rays that light contains;
- oxygen because, even if the vehicle normally parks in a closed garage, thus sheltered from sunlight, it cannot be sheltered from oxidation;
- temperature, variations of temperature, and humidity;
- ozone and all electromagnetic radiation from the environment.

It appears to be thus pertinent to determine the lifespan of the wiper blade as a function of its time exposed to the air.

In addition, it is frequent that drivers are incapable of remembering when they last changed their wiper blades. In effect, such an operation is not generally entrusted to a vehicle repair specialist who can, for example, proceed to a systematic, regular replacement of the blades.

It is known, for example application WO/01896, to use wear indicators that change color as a result of exposure to the environment. This type of indicator presents the major inconvenience of only being sensitive to one parameter of wear, for example ultraviolet rays.

The goal of this invention is to allow the driver to determine the state of reliable wear of the wiper blades of his vehicle via a wear indicator that is representative of real wear constraints, and not dependent on sun exposure, that is to say the geographic or meteorological situation, or environment, for example pollution or altitude.

In order to achieve this goal, the invention proposes taking into account, in the composition of the wear indicator, the principal agents or parameters of the wear of the wiper stem of the wiper blades and their combined action in use conditions.

More precisely, the goal of the invention is a motor vehicle wiper comprising a wiper blade that is mounted on the free end of a wiper stem and pressing a wiper stem against a window to be wiper, in which the wiper is provided with an indicator comprising a substance based at least on an azo compound.

It has been remarked that the sensitivity of the azo compounds to chemical (oxygen, ozone) and physical conditions (radiation, temperature, humidity) as well as to mechanical constraints is comparable to that of the elastamers making up the wiping stem.

According to other characteristics of the invention;

- the wear indicator is a multi-layered label comprising an adhesive layer and a plastic support film from at least one inert layer of a reference color and a reactive degradable layer, made up of a substance of a different color based on the azo compound;

- the inert and reactive layers are formed via ink in which an inert chemical pigmentation, defining a reference color, and a base organic pigmentation from the azo by-products are respectively created;



- the inks are successively placed on the plastic support via silk-screening;

- the plastic support is in polyvinyl, polypropylene, or polyester and is covered with a protective layer fixed to the support film, in a detachable manner, via a semi-porous adhesive, this layer being pulled back during the mounting of the blade on the vehicle.

- the wear indicator is carried by the wiper blade.

Other characteristics and advantages of the invention will become clearer in the reading of the detailed description that follows of one example of production, in reference to the attached drawings that represent, respectively:

- figure 1, front view of an example of an wear indicator of a wiper according to the invention;

- figure 2, cut view according to the plane II-II of the wear indicator according to figure 1.

One has represented on figures 1 a motor vehicle wiper 10 that essentially comprises a wiper arm 12 at the free end 14 of which is mounted in articulation a wiper blade 16.

The wiper blade 16 comprises an articulated structure 18 which carries, via claws 20, a wiping stem 22 generally created in a supple elastomer material. The articulated structure 18 is designed to press, with its entire length, the wiping stem 22 against a window to be wiped on the car,

Conforming to the specifications of the invention, the wiper blade 16 carries an wear indicator 1 incorporating organic ink pigmented based on an azo by-product, sensitive and degradable as a result of the chemical attacks and the mechanical constraints to which it is subjected.

The wear indicator 1 can also be attached to places other than the wiper, as long as it is easily visible while the wiper blade 16 is mounted on the vehicle.

One uses as azo by-product an alkaline-terrine salt azo with a sulfuric function. In other examples of production, the compounds used can be double-azos,

tetra-double-azos, or sulfuric function azos, taken individually or in combination. Preferably, the compound used furnishes a black color in such a way as to clearly distinguish the deep vibrant color that appears while the ink pigmented via the azo by-product is decomposed.

In the production example, the wear indicator is created in the form of a sticker label covered with a protective film 2 in polyethylene, resistant specifically to ultraviolet radiation and the oxygen in the air. This film adheres to the rest of the label via an adhesive semi-porous layer, in order to be easily detached during installation of the blade 16.

It appears more precisely on figure 2, which illustrates the label 1 in cut view, which figure makes up, in addition to the film 2, a support film 3 in polyvinyl, the lower face of which is coated with an adhesive 4 with a strong adhesion capability which allows the assurance of definitive, reliable fixation of the wear indicator 1 on the blade 16. Other plastic materials can be used for the support film, for example from polyester or polypropylene.

On the support film 3 is placed a first layer of ink 5, colored yellow with chemically inert pigments, and covered with a second layer of ink 6 of which the color is obtained via incorporation of organic pigments of azo by-products. At the fabrication of the wear indicator 1, the ink layers 5 and 6 are successively placed via a silk-screening technique.

The label is covered by a mask in the shape of a protective film 2, fixed to the support film 3 via a semi-porous adhesive 7. The mask is pulled back during the mounting of the blade on the vehicle while removing it from the support.

Over the course of time, chemical, physical, and mechanical attacks destroy the azo pigments of the upper layer 6. Once totally decomposed, it then displays the yellow lower layer, which hasn't been subjected to any attacks and which indicates an advanced state of wear of the wiping stem.

One has the advantage to choose an intense coloration for the lower layer 5 while it is under the form of a lower degree of oxidation. Thus, noticing the changing color of the wear indicator will be clearer.

• • •

## CLAIMS

1. Motor vehicle wiper comprising a wiper blade (16) mounted at the free end (14) of a wiper arm (10) in order to press a wiping stem (22) against a window to be wiped, characterized by the wiper being provided with an wear indicator (1) comprising a substance based at least on an azo compound.

2. Wiper according to claim 1, characterized by the wear indicator (1) being a multi-layer comprising an adhesive layer (4) and a plastic support film (3) of at least one inert layer (5) made of a substance of a reference color and a reactive degradable layer (6) made from a substance of a different color based on the azo compounds.

3. Wiper according to claim 2, characterized by the inert and reactive layers being formed respectively by an ink in which a chemically inert pigmentation, defining the reference color, and an organic pigment based on azo by-products are produced.

4. Wiper according to claim 3, characterized by the organic pigments being mixed with mineral oxides, notably with titanium oxide.

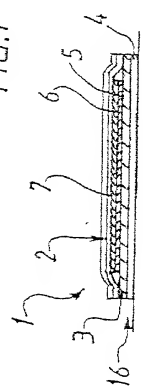
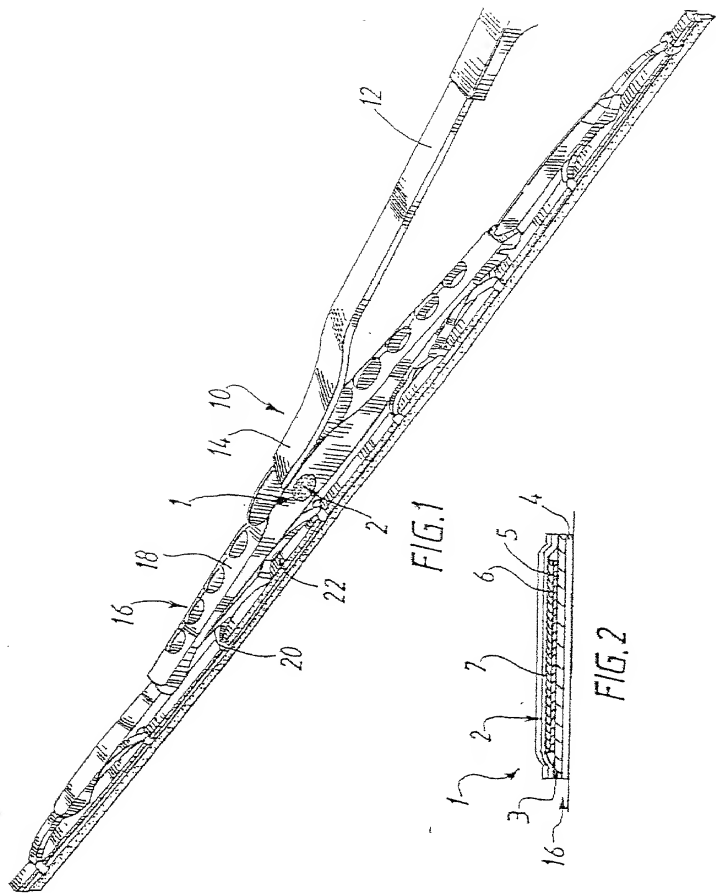
5. Wiper according to claim 3, characterized by the inks being successively places on the plastic support via silk screening.

6. Wiper according to one of claims 2 to 5, characterized by the plastic support being in polyvinyl, polypropylene or polyester and being covered by a protective hood (2) fixed to the support film (3) in a detachable manner, via a semi-porous adhesive (7), this mask being pulled back during the mounting of the blade (16) on the wiper.

7. Wiper according to one of the preceding claims, characterized by the wear indicator (1) being carried by the wiper blade (16).

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JC18 Rec'd PCT/PTO 1 5 JUN 2001

1

VWF-516-A

Motor vehicle wiper comprising a wear indicator.

This invention concerns the wiping means of the windows of motor vehicles and, more specifically, their wear.

A wiper blade equipped with its elastic wiper stem is a piece of the vehicle that wears out and which is necessary to replace regularly if one wants to guarantee a good wiping quality of the window. This proves to be even more important for the driving safety while one is using the wiper blade on the front windshield of the vehicle.

The sources of wear are numerous and the blade is susceptible to degrading as much at the level of the wiper stem as at the joints and the articulation mount that carries it.

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The agents of such deterioration are principally:

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- oxygen because, even if the vehicle normally parks in a closed garage, thus sheltered from sunlight, it cannot be sheltered from oxidation;
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It appears to be thus pertinent to determine the lifespan of the wiper blade as a function of its time exposed to the air.

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presents the major inconvenience of only being sensitive to one parameter of wear, for example ultraviolet rays.

The goal of this invention is to allow the driver to determine the state of reliable wear of the wiper blades of his vehicle via a wear indicator that is representative of real wear constraints, and not dependent on sun exposure, that is to say the geographic or meteorological situation, or environment, for example pollution or altitude.

In order to achieve this goal, the invention proposes taking into account, in the composition of the wear indicator, the principal agents or parameters of the wear of the wiper stem of the wiper blades and their combined action in use conditions.

More precisely, the goal of the invention is a motor vehicle wiper comprising a wiper blade that is mounted on the free end of a wiper stem and pressing a wiper stem against a window to be wiped, in which the wiper is provided with an indicator comprising a substance based at least on an azo compound.

It has been remarked that the sensitivity of the azo compounds to chemical (oxygen, ozone) and physical conditions (radiation, temperature, humidity) as well as to mechanical constraints is comparable to that of the elastamers making up the wiping stem.

According to other characteristics of the invention,

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- the inert and reactive layers are formed via ink in which an inert chemical pigmentation, defining a reference color, and a base organic pigmentation from the azo by-products are respectively created,

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- the plastic support is in polyvinyl, polypropylene, or polyester and is covered with a protective layer fixed to the support film, in a detachable manner, via a semi-porous adhesive, this layer being pulled back during the mounting of the blade on the vehicle.



- the wear indicator is carried by the wiper blade.

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Conforming to the specifications of the invention, the wiper blade 16 carries an wear indicator 1 incorporating organic ink pigmented based on an azo by-product, sensitive and degradable as a result of the chemical attacks and the mechanical constraints to which it is subjected.

The wear indicator 1 can also be attached to places other than the wiper, as long as it is easily visible while the wiper blade 16 is mounted on the vehicle.

One uses as azo by-product an alkaline-terrine salt azo with a sulfuric function. In other examples of production, the compounds used can be double-azos, tetra-double-azos, or sulfuric function azos, taken individually or in combination. Preferably, the compound used furnishes a black color in such a way as to clearly distinguish the deep vibrant color that appears while the ink pigmented via the azo by-product is decomposed.

In the production example, the wear indicator is created in the form of a sticker label covered with a protective film 2 in polyethylene, resistant specifically to ultraviolet radiation and the oxygen in the air. This film adheres to the rest of the

label via an adhesive semi-porous layer, in order to be easily detached during installation of the blade 16.

It appears more precisely on figure 2, which illustrates the label 1 in cut view, which figure makes up, in addition to the film 2, a support film 3 in polyvinyl, the lower face of which is coated with an adhesive 4 with a strong adhesion capability which allows the assurance of definitive, reliable fixation of the wear indicator 1 on the blade 16. Other plastic materials can be used for the support film, for example from polyester or polypropylene.

On the support film 3 is placed a first layer of ink 5, colored yellow with chemically inert pigments, and covered with a second layer of ink 6 of which the color is obtained via incorporation of organic pigments of azo by-products. At the fabrication of the wear indicator 1, the ink layers 5 and 6 are successively placed via a silk-screening technique.

The label is covered by a mask in the shape of a protective film 2, fixed to the support film 3 via a semi-porous adhesive 7. The mask is pulled back during the mounting of the blade on the vehicle while removing it from the support.

Over the course of time, chemical, physical, and mechanical attacks destroy the azo pigments of the upper layer 6. Once totally decomposed, it then displays the yellow lower layer, which hasn't been subjected to any attacks and which indicates an advanced state of wear of the wiping stem.

One has the advantage to choose an intense coloration for the lower layer 5 while it is under the form of a lower degree of oxidation. Thus, noticing the changing color of the wear indicator will be clearer.

The invention is not limited to the example of production described and represented. For example, in order to better control the kinetic of the degradation reaction, one can superimpose on the reactive layer a diffused layer that slows the contact between this layer and the chemical attacks. In addition, it is possible to mix the organic pigments to the mineral oxides, notably to some titanium oxide, in order to improve the sensitivity of the indicator.

## CLAIMS

1. Motor vehicle wiper comprising a wiper blade (16) mounted at the free end (14) of a wiper arm (10) in order to press a wiping stem (22) against a window to be wiped, characterized by the wiper being provided with an wear indicator (1) comprising a substance based at least on an azo compound.

2. Wiper according to claim 1, characterized by the wear indicator (1) being a multi-layer comprising an adhesive layer (4) and a plastic support film (3) of at least one inert layer (5) made of a substance of a reference color and a reactive degradable layer (6) made from a substance of a different color based on the azo compounds.

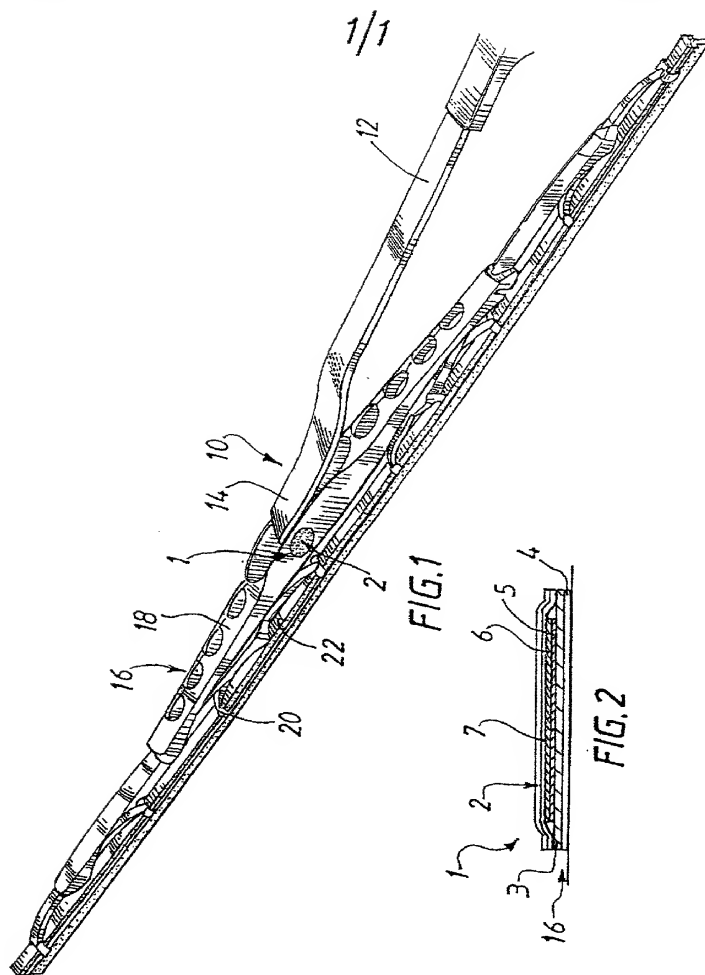
3. Wiper according to claim 2, characterized by the inert and reactive layers being formed respectively by an ink in which a chemically inert pigmentation, defining the reference color, and an organic pigment based on azo by-products are produced.

4. Wiper according to claim 3, characterized by the organic pigments being mixed with mineral oxides, notably with titanium oxide.

5. Wiper according to claim 3, characterized by the inks being successively places on the plastic support via silk screening.

6. Wiper according to one of claims 2 to 5, characterized by the plastic support being in polyvinyl, polypropylene or polyester and being covered by a protective hood (2) fixed to the support film (3) in a detachable manner, via a semi-porous adhesive (7), this mask being pulled back during the mounting of the blade (16) on the wiper.

7. Wiper according to one of the preceding claims, characterized by the wear indicator (1) being carried by the wiper blade (16).





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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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